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Best Management Practices

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Integrated Pest Management (IPM) Practices

Protecting ground water and surface water

Protecting Montana's ground and surface water from impairment is of vital importance to the future of our water resources. The implementation of an Integrated Pest Management (IPM) Program when added to cropping management will maximize nutrient and water use efficiency and protect ground and surface water.

IPM integrates the complete system and uses of naturally occurring pest controls. The intent is to target and sometimes reduce overall pesticide use. These controls include the weather, disease agents, predators and parasites. Various biological, physical and chemical control and habitat modification techniques are also used.

Considerations for Integrated Pest Management

Integrated pest management uses a systems approach to prevent and reduce pest damage to tolerable levels. This approach uses natural predators and parasites, genetically resistant hosts, environmental modifications, and when necessary and appropriate, pesticides. The decisions are based on economic thresholds and **not** the mere presence of a pest.

The implementation of an IPM program does not remove pesticides as an option, or guarantee a reduction in pesticide use. An IPM program only suggests appropriate uses of pesticides and other control options. However, these control measures alone can't solve all problems. Each control measure has benefits and drawbacks.

Purpose of Integrated Pest Management

The IPM program evaluates the costs, risks and benefits of a particular control strategy, including ground water protection. The IPM program considers potential interactions between key pests, their natural enemies, other actual or potential pests and other living and non-living factors. The choice of methods must be based on ongoing monitoring and evaluation of the system. In an IPM program, pest control will not necessarily translate into complete eradication of the pest. But, it is possible to suppress pest populations below the level at which they cause acceptable damage.

Best Management Practices

The proper combination of best management practices in agricultural production systems provides for the protection and maintenance of both ground water and surface water quality. However, some practices which protect surface waters may contribute to ground water impairment. For example, conservation tillage may help to prevent erosion losses, but may provide more opportunities for downward movement of potential contaminants. Often the use of several practices will be necessary. A single practice will not be adequate.

First, identify the pest and the extent of the problem before determining the need for and selection of a pesticide or other control measure. Second, consider choosing a control strategy (like one of the following) to meet your need for pest control.

- Select a strategy that will not impact ground water and other parts of the environment.
- Choose a strategy that is least-disruptive of natural controls.
- Use a strategy that is least-hazardous to human health.
- Consider a strategy that is least-toxic to non-target organisms.
- Choose a strategy that is most likely to produce a permanent reduction in the environment's ability to support the pest.
- Select a strategy most likely to be carried out reasonably and effectively.
- Consider a cost-effective strategy.

Third, make all pesticide selections based on characteristics such as method of application, solubility, toxicity, degradation and adsorption. To minimize the potential for pollution of ground and surface water, also consider application site characteristics such as soil type, geology, depth to water table, proximity to surface water, topography and climate. After these factors have been determined, select combinations of practices to reduce excess percolation and runoff for irrigated lands.

✓ Determine the best irrigation system (i.e., flood vs. sprinkler).
✓ Learn and use proper irrigation water management.
✓ Choose a cropping sequence to maintain crop cover.
✓ If applicable, use conservation tillage.
✓ Choose a cover and green manure crops.
✓ Use field vegetative borders.
✓ Consider using contour stripcropping.
✓ Consider mulching or planting grassed waterways.
✓ Use crop residue or plant permanent vegetative covers such as pasture and hayland.

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Considerations of Integrated Pest Management

Every crop's yield and quality has the potential to be effected by pests. Careful planning throughout the cropping sequence is an essential component of a successful IPM program. A good IPM program incorporates problem identification, control strategies, economic analysis, implementation, record keeping and careful evaluation of the effectiveness of all control measures.

Base crop management decisions on accurate field information. Using consistent and methodical field monitoring will lay the groundwork for an effective IPM program. Scouting fields can maximize production efficiency if the producer or consultant knows what to look for, when to look and how to use the information acquired. Management decisions can then be made based on an accumulation of field scouting results such as,

- Maximizing control and minimizing crop injury by optimizing pesticide application timing.
- Rotating non-host crops (such as alfalfa after wheat) before disease problems cause significant yield reduction in crops.
- Planting a resistant variety (such as sawfly-resistant wheat) and use of a seed treatment (such as for wireworm control).

Field Scouting

Field scouting depends mainly on personal observation skills. A good way to accomplish this is to relate scouting to taking a series of mental pictures. As a field scout, you should assume the role of a camera to observe and record what is seen in the field. The first "picture" should be a wide-angle view of the entire field. This picture provides an impression of the field and denotes specific areas that may need further checking. This first look often reveals mechanical problems such as fertilizer skips, windrow effects and tillage patterns. These problems often are seen as field variations having straight and definite lines.

The next picture is similar to a family portrait and should be focused on a specific area, six to 15 feet away. This picture views a group of individual plants and shows their relationship to the rest of the immediate area. Possible observations are color, variation in height, invader plants, dying or stunted plants, white heads and skips in the row. These observations could indicate nutrient deficiencies, hail injury, herbicide damage or possible insect, disease or weed problems.

The last picture is a close-up view. This shows specifically what is wrong with the plants. To do this, plants in an area of about one square yard should be observed individually. Above-ground and below-ground parts of some of these plants should be examined carefully, preferably with a hand lens. Pest problems, other types of plant injury, weed species present, and the crop's stage of development can also be identified and recorded at this time. Walking fields is actually the best method of field scouting. As a general rule, fields should be scouted weekly. Some fields should be checked every few days when infestations are approaching economic threshold levels. If no symptoms or signs of pests are present, you need not waste time with detailed counts. With practice, you will soon become efficient at scouting pest populations and making IPM decisions based on the pest information collected.

Integrated Pest Management Records

Maintaining accurate records is an essential part of pest management and is valuable when investigating pesticide performance problems. Collecting and evaluating pertinent field information helps to identify and solve crop management problems. The results often mean prevention or reduction of crop losses. This results in maximization of production efficiency, thereby increasing profits while protecting the environment.

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